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Governing contemporary commons: The Institutional Resource Regime in dialogue with other policy frameworks

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ABSTRACT

This introductory article to the special issue on the Institutional Resource Regime (IRR) framework presents an overview of the latest developments of the framework. The IRR framework has been established as an important supplement to existing (neo)institutional approaches focusing on the management of natural resources. One of the major contributions of the IRR framework is its ability to appraise the institutional complexity of heterogeneous resource use situations at the nexus of public regulatory actions and private responses, to link the resulting institutional arrangements with claimants' access to the resource, and to propose causal mechanisms explaining the relationship between institutions and sustainability.

1. Introduction

After 20 years of existence and continuous development, the Institutional Resource Regime (IRR) framework has been established as an important supplement to existing (neo)institutional approaches focusing on the management of natural resources (Aubin, 2007; de Buren, 2015; Gerber et al., 2009; Knoepfel et al., 2001, 2007; Bolognesi and Nahrath, 2020). The IRR contributes to the understanding of the institutional and political dimensions of resource governance. Common-pool resources ("commons") refer to a form of resources that are prevalent but particularly challenging to regulate: uses are competitive, leading to potential degradation, but users are difficult to exclude (Ostrom, 1990). As such, they have received a lot of attention by scholars. Many analyses of common-pool resources have focused on the regulation of homogeneous use situations (e.g., the literature on fisheries, forestry and aquifers). Due to their simplicity, these settings have facilitated the development of relatively simple models (Schlager and Ostrom, 1992). However, an analytical framework that aims to understand a more representative range of resource uses must be capable of portraying the complexity of heterogeneous use situations (Steins and Edwards, 1999). Despite being highly challenging to appraise, these situations are also the most common. The IRR framework aims to follow a realistic analytical approach and incorporate the different regulatory procedures of all uses of a given resource in a single

framework (Table 1).

An institutional regime (IR) is defined as encompassing all the formal rules governing resource uses in a given area. These rules result from private law (property rights¹, contracts, conventions, etc.), as well as public law (national, regional and municipal laws formulated within the framework of public policy programs). Their combined effect regulates the rights to use, manage, access to, inherit, dispose or transfer a resource. Because of its institutionalized nature, an IR has a stability guaranteeing regularity and predictability of the modes of regulation of the resource, as well as decisions and sanctions resulting from its implementation. At the interstices of the formal rules, are informal arrangements such as ad hoc agreements, which are typically dependent on the social norms and values in a given context (Gerber et al., 2009; Schweizer, 2015). Together the formal and informal rules govern the behavior of the owners or users of the resource (or of specific goods and services provided by it). The IRR framework analyzes and compares the different configurations of an IR over time and across space, both theoretically and empirically, and provides heuristic tools to conceptualize their effects on the sustainability of a resource. One of the major contributions of the IRR framework is its ability to appraise the institutional complexity of heterogeneous resource use situations at the nexus of public regulatory actions and private responses, to link the resulting institutional arrangements with claimants' access to the resource (Ribot and Peluso, 2003), and to propose causal mechanisms explaining the

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E-mail address: jean-david.gerber@giub.unibe.ch (J.-D. Gerber).¹ In line with a civil law tradition and much of the legal practices in continental Europe and countries of similar legal tradition, we use the term "property rights" to refer to the rights grounded in the institution of property. A more Anglo-Saxon tradition would refer to them as "rights of ownership".

Table 1

Typology of resource use situations based on the example of the forest resource, and relevance of the IRR approach (Knoepfel et al., 2001, p. 16, based on Young, 1992, p. 103).

| Number of users | Types of use | |
|--|---|--|
| | Homogenous uses: Use of a single good/service | Heterogeneous uses: Use of multiple goods and/or services |
| Single user (or collective group of users) | “Single use” : exclusive use of a forest by a wood pulp company to grow timber for paper production | “Multiple use” : forest maintenance by road construction authority targeting protection against erosion and traffic noise reduction |
| Multiple users (or groups of users) | “Common use” : urban forest used as recreation area by different categories of inhabitants → Self-organized Common Pool Resources (CPR) regime (as described by Ostrom, 1990) | “Joint use” : the Swiss Forest Act defines 3 “forest functions” that forests need to fulfil: the protective, social and economic functions (Article 1) → Institutional Resource Regime (IRR) |

relationship between institutions and sustainability.

The IRR framework contributes to a broad set of questions on the institutional and political dimensions of resource governance:

- *Political-legal complexity and organisation.* The state shapes social behaviour through institutions (constitutions, public policies and property rights). They define the organisation of the state, the separation of power and administrative procedures (Brennan and Buchanan, 1985); they bestow constitutional legitimacy on the institution of private property (Bromley, 1992; Heinsohn and Steiger, 2009); they impose indicators and standards (Desrosières, 2011). How does this complex regulatory environment impact on coordination, fit or scale in the governance of resource uses (Varone et al., 2013; Nahrath and Guerrin *this volume*)? In light of the growing complexity of modern public intervention (Weber, 1968), how can the coherence of the IRR be guaranteed?
- *Policy instruments.* The selection of policy instruments generates political activity because public intervention has a redistributive effect (Hood, 1983; Knoepfel, 1986). Specific policies lead to the use of a particular set of policy instruments and methods (Salamon, 2000). How do actors use this legal complexity – e.g. through the strategic selection of instruments, venue shopping or differential rule activation – to improve their access to specific resources?
- *Property.* Due to the constitutional guarantee of property, property-right holders are in a strong position to interfere with the implementation of public policies with a spatial impact (Gerber and Rissman, 2012; Knoepfel, 2018). Which role does the privileged position of title holders play in resource management? Under which conditions do public actors successfully counteract their powerful resource claims? Which circumstances push the public hand to (partially) withdraw a resource from the market (privatization vs. collectivisation, commodification vs. decommodification of resources; Gerber and Gerber, 2017; Vatn, 2018)?
- *Use conflicts.* As the expression of an ideology, public policies impose a particular approach to understanding public problems, to framing the mental interpretation of these problems and to imposing specific values and representations (Gramsci, 1971; Foucault, 1991; Jobert and Muller, 1987; Jenkins-Smith and Sabatier, 1993). Conflicts can either be appraised as problematic phenomena that threaten social stability and which must be “resolved”, or they can be seen as normal phenomena, constitutive of social life (Martinez-Alier, 2002; Paavola, 2007). This first understanding fosters social engineering theories on cooperation, concertation and negotiation seeking to “pacify social relations” (Torre, 2010). The second understanding insists on the fact that conflicts are generated wherever power allocation is asymmetric. Is a conflictual resource-use situation the result of an incoherent IR that can be mitigated through an improvement of the coherence of the regime? Or are the conflicts driven by systemic contradictions – e.g. inherent to capitalistic modes of production (Harvey, 2007)?
- *Self-organization.* Actors are not passive toward the role assigned to them by institutional rules and regulations (Castells, 1983). Top-

down rule-making leads to important differences between formal rules and real-life implementation (Hupe and Hill, 2020). Places of informality appear in the gaps left open between formal rules (Roy, 2005). Which resistance strategies – political or collective action, counter-discourses, “weapons of the weak” (Scott, 1987) – do resource users develop? Do actors’ strategies lead to implementation deficits (due to loopholes) or do they also make it possible for resource users to balance contradicting policy incentives through self-organization (Netting, 1981; Schweizer, 2015; see also Kellner et al, *this volume*)? In many resource use situations worldwide, resource users have also been able to generate robust institutional arrangements through community-based collective action (Ostrom, 1990; Agrawal, 2001; Cox et al., 2010; Haller et al., 2016). How do IRRs enable community-based collective action in sustainable ways? Which informal mechanisms of accountability occur within self-organized arrangements (Thomann et al., 2018)?

- *Transformation toward sustainability.* Sustainable development is not only a discourse mobilized by different public and private actors to legitimize their actions regarding resources, it is also a set of values and practices shaping resource uses (Jackson, 2009). How do IRs evolve over time in connection with the changing – often deteriorating – condition of resources (e.g. biodiversity, transportation and energy infrastructures, affordable housing stocks or climate)? From a normative perspective, the question remains open as to how an IR contributing to a more sustainable use of resources could emerge – or should be designed (Howlett and Rayner, 2007; Rogge and Reichardt, 2016; Patterson et al., 2017).

This special issue takes stock of and critically reflects on the latest developments of the IRR framework. In doing so, the central aim is to open a dialogue between the IRR framework and other analytical frameworks, and wherever possible generate some real cross-fertilization. This opening of the discussion sheds light on future research paths in natural resource management. A key rationale of the special issue is to provide such contributions at a time where the understanding of the institutional and political dimensions of resource governance is, maybe, more crucial than ever.

This article starts with a short presentation of the IRR framework (for more complete overviews, please refer to Gerber et al., 2009; Knoepfel et al., 2007) along with a brief presentation of the historic development of the framework. Then we present the different contributions of this special issue and highlight the dialogue that they open with other frameworks or concepts.

2. The Institutional Resource Regime (IRR) framework in a nutshell

Classic institutionalism often led to unravelling the functioning of institutions in a descriptive legalistic language (Thelen, 2003). In contrast, the new institutionalist perspective postulates a mutual interaction between actors and institutions; the actors are influenced by rules, norms and conventions embedded in collective action, while at the

same time the institutions evolve because of the actions and decisions of the actors (Lowndes, 1996; Koelble, 1995). The IRR framework is interested in political action, which is interpreted as the result of interactions between intentionally acting actors in response to political-legal institutions. Political-legal institutions, such as public policies, property rights, the division of competences among political levels, or procedural rules, are analyzed from the perspective of the constraints and opportunities they offer to the actors using a specific resource. The IRR approach has thus complemented (neo)institutionalism in several ways. In its early days at the turn of this century, IRR applications have relied on classic institutionalism to analyze in their historical resource screenings all legal dispositions theoretically affecting resource uses in a given national setting. In parallel to this in-depth exploration of political-legal mechanisms in force, following actor-centered forms of institutionalism such as developed by Mayntz and Scharpf (1995) or Scharpf (2000), the IRR has become increasingly interested in the interplay between institutions and actors in the management of natural resources.

Scholars have developed the IRR framework to combine two different disciplinary approaches to environmental problems so as to overcome the reciprocal limits of these approaches (Kissling-Näf and Varone, 2000; Knoepfel et al., 2001; Varone et al., 2002; Knoepfel et al., 2007; Gerber et al., 2009; Varone and Nahrath, 2014). On the one hand, the analysis of the environmental public policies makes it possible to account for all the complexity of the functioning of the state institutions, but fails to capture the central importance of property rights in resource regulation and tends to promote a sectoral view of problems. On the other hand, institutional economics of natural resources puts property rights in the center of the analysis (in particular the need to define them clearly), but has major difficulty to capture the complex role played by the state as a collective actor (Vatn, 2005).

2.1. Institutions, actors and resources

The IRR framework analyses the causal relations between (1) the IR in force (public policies and property rights), (2) the resource uses of actors (owners and non-owners) and their appropriation strategies, and (3) the condition of the resource (Nahrath and Bréthaut, 2016). The goal of such an approach is to investigate causal links between the complex institutional contexts typical of Western democracies, user constellations and the condition of a resource (Fig. 1).

2.1.1. Resources as objects of appropriation strategies

Actors claim access to the goods and services provided by resources. A resource-centered perspective is based on a constructivist approach: a resource emerges from a relational process linking an 'object' – that can

be material or non-material (water, soil, forest, landscape, air), constructed (housing, infrastructure), or social and cultural (know-how, knowledge) – and an economic, cultural or ecological 'production system' needing these inputs to satisfy human needs (Kébir, 2010). According to this relational perspective, 'resources are not automatically viewed as factors with an inherent use-value and pre-determined application. [...] The use-value of a resource depends upon the social context within which goals and capabilities are shaped' (Bathelt and Glückler, 2005: 1547).

Even if resources are neither "natural", nor "given", they can still be depleted or polluted, and access to them be confiscated. This is the reason why uses must be governed, otherwise the resource might lose its ability to satisfy needs. However, regulations are usually organized in a sectoral manner (e.g., agricultural policy, mining, transport, energy, national parks) and not according to resources (land, soil, water, air). Therefore a resource-based approach calls for a fundamental shift of perspective – away from a logic based on the control and restriction of pollutant emissions (management and internalization of negative externalities) toward a logic based on the balanced management of the stocks and reproductive capacities of resource systems (Ostrom, 2007, 2009).

2.1.2. Institutions: important determinants of resource uses

Like all institutionalist approaches, the IRR framework understands that the "rules of the game" are essential to understand how actors use a resource. In Western democracies, whose legal principles were historically imposed all over the world, the law is the product of a socio-political compromise – crystalizing in space and time the complex power relationships shaping our representations of the role of specific resources in our societies and of the need to regulate their uses. This compromise is never stable, as laws and regulations are revised, remain unimplemented, can be diverted or even hijacked. However even in "weak states", the formal legal framework provides a reference that shapes individual actions, even if actors deliberately chose not to play by the rules (Hagmann and Hoehne, 2009; Bayart, 2009). Informal rules and arrangements appear and thrive in the interstices left between formal rules (de Buren, 2015). Informal institutions describe actors' norms and values in a given context and the ensuing generally accepted rules-in-use (Ostrom, 2005; Thomann et al., 2018).

The IRR approach builds on the empirical observation and political-judicial theory that not all rules are equal. Formalized rules (legally constraining resource uses can be divided into two main categories – public policies and property rights – which follow divergent objectives and rely on opposing legitimization logics.

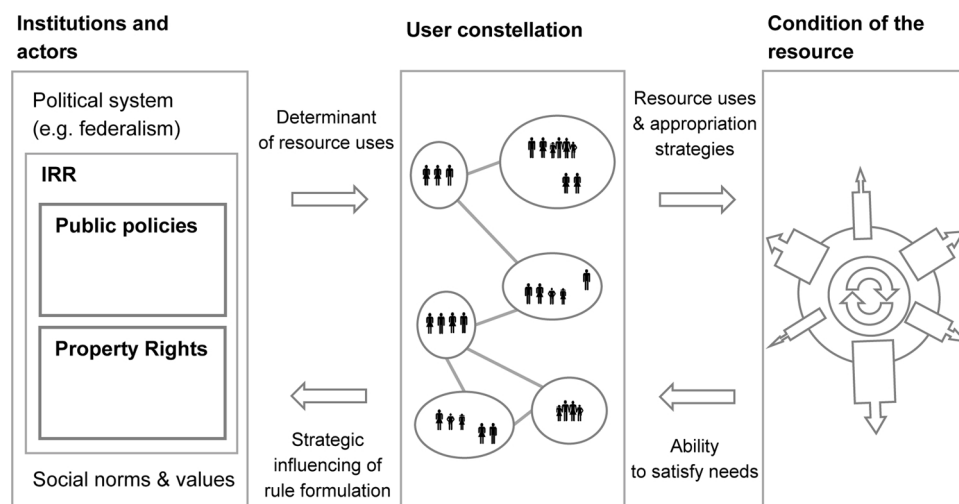


Fig. 1. Three variables: resource, actors, institutions. Source: modified from Kissling-Näf and Varone (2000, p. 238).

- Public policies aim at solving a public problem recognized as such by democratic instances (e.g., the parliament) (Knoepfel et al., 2011a,b). Through public policies, the state receives the power to regulate the action of those actors who are thought to be at the source of the problem – in the name of the public interest. Public policies are regularly revised, not only because the problem they are targeting constantly evolves, but also because changing majorities propose alternative solutions to the problem.
- Property rights protect individuals from the state; as such they defend private interests against the (potentially absolutist) action of the state. Property rights are grounded in the Civil Code (or similar in common law contexts); they are much more robust and stable than the rules stemming from public policies (public law).

Empirical evidence reveals that actors who have the choice prefer to secure their access and use rights through property titles rather than stipulations stemming from public policies, because the former are more robust than the latter. Conservation organizations, for instance, often chose to acquire the land where they want to conserve biodiversity rather than to rely on zoning (land-use planning policy) because property rights are permanent and do not change according to political majorities (Gerber and Rissman, 2012).

Property rights and public policies created in representative democracies interact in a dialectical relationship: At the beginning of the 19th century, Constant (1988) observed that property rights are the stumbling blocks of a functioning representative democracy. Property rights make the private appropriation of goods and services provided by resources possible, as long as public policies do not restrict exclusive appropriation in the name of the general interest(s). When a public policy restricts the room for discretion of landowners, it de facto creates new use rights (*sensu lato*) in favor of non-owners and therefore has a redistributive effect.

Obviously, there are other categories of formalized rules. However constitutional rules, human rights or global conventions (e.g. UN Convention on Biological Diversity) do not directly shape use rights to resources, as they first need to be (in some cases transposed and) implemented through national public policies. Many private standards or certification schemes develop in the shadow of specific public policies (e.g. when a technical requirement needs to be carried out according to the “state of the art”), as the state cannot regulate in detail all technical processes. Some formalized rules also appear outside of public policies, mostly in the domain of private law. This is the case of contracts between individuals, internal rules of private organizations (e.g. bylaws of a cooperative), even agreements between municipalities for the delivery of specific services, etc. Private certificates and labels, although often backed up by the state, are also specific forms of self-organization that impact resource uses. Depending on their degree of integration in sectoral public policies, the IRR framework considers these rules as either part of the regime (through different policy instruments) or of the Localized Regulatory Arrangement (see §2.4 below).

The IRR framework considers that capturing the interactions among different public policies (e.g., protection and use policies), among property rights or between public policies and property rights (e.g., land use planning and landownership) is fundamental to understand resource uses and degradation. For instance, an access right granted to the housing resource has a fundamentally different scope, longevity and robustness if it is backed up by a property title inscribed in a land register (land title, share in a housing cooperative), if it is based on tenant law (rental contract), social policies (subsidy to pay the rent) or temporary housing arrangement (contract based on loaning law). These distinctions are essential to capture patterns of resource uses, resource exclusive or collective appropriation, or phenomena of exclusion.

Much has been written on the fragmentation of property (through processes of financialization, securitization of real estate or outsourcing of resource-consuming productive activities) leading to the extension of decision chains and the anonymization of ownership (Theurillat et al.,

2016). Nevertheless, even if management responsibilities become diluted, property as an institution is as important as ever because it entitles the owner to decide about the uses on a specific plot of land and corresponding resources.

2.1.3. Actors between structure and agency

The IRR framework sees the relationship between institutions and agency as dialectical. Individuals are shaped by the internalization of external structures which become “natural” to the individuals; their action is then the result of the exteriorization of these internalized frames of reference (Bourdieu, 1979, 1998). Existing (formal and informal) institutions define the field of possibilities of individuals. Institutions are the “conventions, norms and formally sanctioned rules of a society. They provide expectations, stability and meaning essential to human existence and coordination. Institutions regularize life, support values and protect and produce interests” (Vatn, 2005). Formal institutions (legally) frame resource users in their activities (e.g. limit the scope of possible uses). Simultaneously, users can exercise their agency within this frame of reference and take advantage of the opportunities granted by those rules.

2.2. Four paths of intervention

The IRR framework identifies four paths of intervention, which influence the behaviour of resource users (Fig. 2).

The four paths depicted in Fig. 2 can be described as follows:

- 1 Policies with no impact on the content of use or disposal rights: e.g., information campaigns, economic incentives (tax or subsidies).
- 2 Policies with an impact on the scope and content of use or disposal rights (e.g., zoning, land readjustment) leading to: regulation of use rights without infringing on formal ownership: e.g., limitations on the right to access the land, to emit pollutants, to build through different command-and-control instruments.
 - regulation of disposal rights: prohibition of sale to certain purchasers (e.g., foreigners, non-farmers), etc.
- 3 Legal redefinition of property rights with an impact on the scope and content of use or disposal rights: e.g., introduction of tradable development rights, introduction of condominium ownership in the Civil Code, new right to expropriate ‘rogue neighbours’, or pre-emption rights (right of first refusal) granted to municipal authorities.
- 4 Redistribution of property titles:
 - limited and punctual intervention: e.g., formal expropriation, targeted purchase of land,
 - radical and profound intervention: privatization or nationalization (with or without compensation).

Policy interventions with no impact on property rights (e.g., policy instruments such as incentives) are comparatively easier to get through a parliament than initiatives aiming to redefine the institutions of property. In many countries, the definition of property rights hardly changes over time, because the delicate balance between use value and financial value of the land is the result of a subtle political-legal compromise (Harvey, 2008). Direct redefinition of the structure of distribution of property rights is rare as well, except in large development projects that pursue a public interest (e.g., infrastructure development).

2.3. Qualifying the regime in force: extent and coherence

The IRR uses two dimensions to qualify the regime regulating a given resource: extent and coherence. The *extent* refers to the number of uses actually regulated by the regime in force. Regulation tends to develop as a response to the appearance of conflicts among competing resource users. For instance, when a new resource – say wind as a source of energy – is discovered, users appropriate the resource until

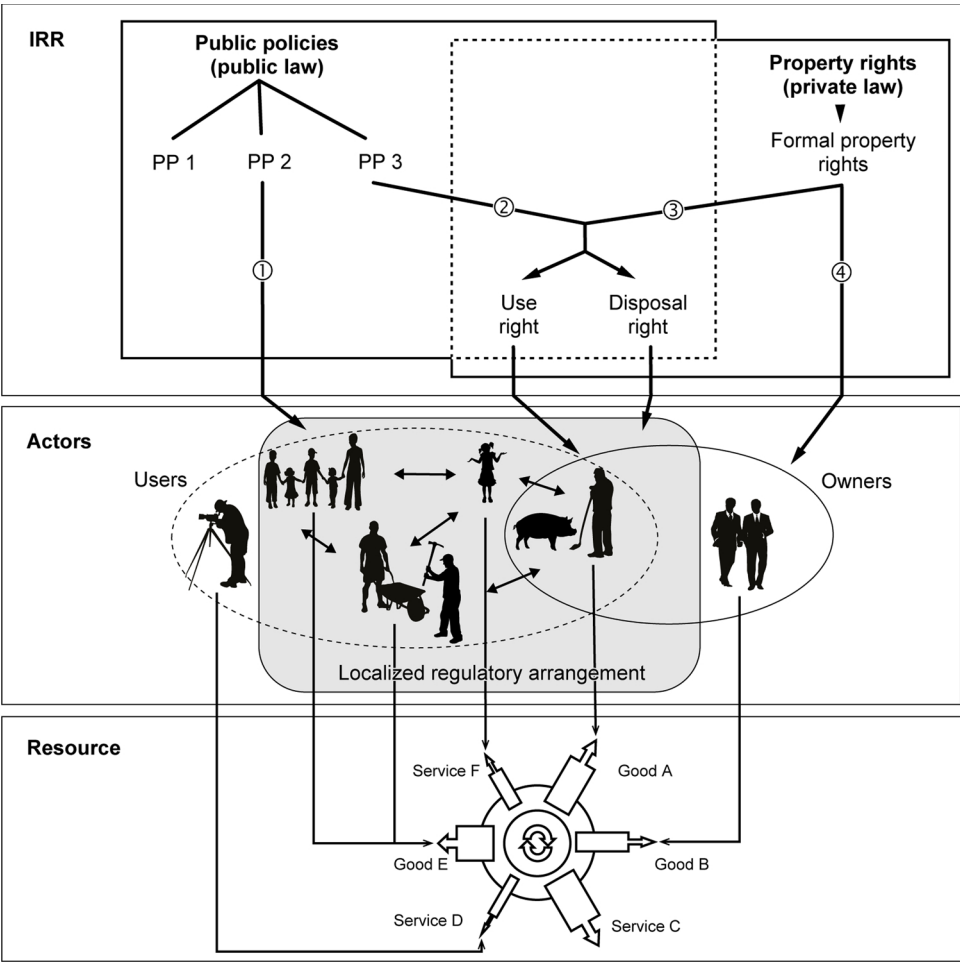


Fig. 2. The behaviour of actors using the resource land can legally be constrained by: ① policies with no impact on the content of use or disposal rights (e.g., information, incentives), ② policies with an impact on the scope and content of use or disposal rights (e.g., zoning regulations), ③ re-definition of property rights with an impact on the scope and content of use or disposal rights (e.g., creation of a system of tradable development rights), ④ redefinition of the structure of the distribution of property titles (e.g., expropriation, nationalization) (following Knoepfel et al., 2003: 54; Doremus, 2003; Gerber et al., 2009). Informal agreements of the LRA are depicted by bidirectional arrows.

their practices come into conflict with other uses – for example, infrastructure may develop before regulation limits the impact of wind turbines on scenic landscape through height restriction.

The *coherence* analyzes the degree to which different regulations are consistent with each other (see also Bolognesi et al., *this volume*); for example, the degree of contradictory incentives that may exist between different sources of regulation. Internal incoherence refers to inconsistency either among public policies (e.g. between protection and use policies) or among property rights (e.g. between unclearly defined property titles or between water rights and landownership). External incoherence refers to inconsistency between property rights and public policies. For example, in many countries, major external incoherence characterizes the IRR of the land resource: through stricter zoning regulations, the land-use planning policy leads to a reduction in the value of land. Yet because of the constitutional guarantee of property, the imposition of strict zoning, which is desirable for the sustainable management of the land resource, is often not possible because the municipalities in charge of spatial planning do not have sufficient financial resources to compensate affected landowners (Varone and Nahrath, 2014).

Based on these two dimensions – extent and coherence – the IRR framework formulates a broad overarching hypothesis that has been empirically verified in a variety of cases (Gerber et al., 2009). According to this central hypothesis, *a regime with high extent and coherence (integrated regime) is more likely to lead to a sustainable use of a given resource than a complex, simple or inexistent regime (Fig. 3)*. This integrated regime is rare in practice. First, the uses of newly discovered resources are usually not regulated yet (inexistent regime). Then, preliminary regulations of initial uses may be coherent, especially if they

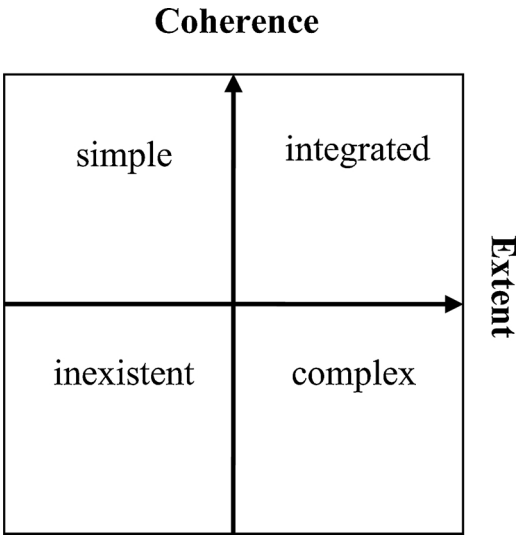


Fig. 3. Typology of Institutional Resource Regimes according to their extent and coherence. Source: Knoepfel et al. (2001, p. 38).

are few (simple regime). However, as state intervention increases, complex regimes tend to develop due to lack of coordination between sectoral regulation efforts. Bolognesi & Pflieger (*this volume*) and Bolognesi and Nahrath (2020) suggest a convincing explanation of such historical processes in demonstrating how “transversal transaction costs” (between property rights and public policies) were leading to “institutional complexity traps”. Today most IRs in established resource

systems can be considered as complex.

Extent and coherence can be discussed theoretically when studying the formal regulations – e.g. such as stipulated in national legislation – impacting resources uses. However, a more realistic picture results when analyzing this empirically according to the conflicts that arise in concrete resource use situations, where informal institutions also play an important role (de Buren, 2015). In practice, not all incoherence or low degrees of extent need action. Only those use situations leading to conflicts and overuse may need regulatory adaptation.

2.4. The localized regulatory arrangement²

In reality, the management of resources depends on the formal rules of the IRR, but also on what Ostrom describes as “rules-in-use” (2005), i.e. rules actually devised and implemented by the actors who use the resource. Within the perimeter of the resource, and in addition to the acts of implementation of the formal rules of the IRR in force (mainly produced by higher levels of government), self-organized, more or less formalized modes of management can be observed. Actors choose deliberately to activate (or not) specific rules of the regime in a given resource system. The combination of formal and informal rules within the perimeter of a resource constitutes a Localized Regulatory Arrangement (LRA) (Knoepfel et al., 2011a,b; Schweizer, 2011; Bréthaut, 2013; de Buren, 2015). LRAs emerge in the interstices left between formal rules, i.e. not independently of the regime in force, but in its shadow. LRA can be defined as a set of more or less formal agreement that regulates resource uses at stake with regards to specific situations.

When formalized, LRAs usually take the form of contracts. As part of private law, the law of contracts involves interactions between private or corporate actors, whereas public law involves interactions between the state and the general population, with the state using its authoritative power granted by public policies. Yet public actors can also establish a private relationship with private or corporate actors, which also falls within the definition of private law in this particular case. The rules of a LRA are directly negotiated within the constellation of actors using the resource. Ad hoc agreements can also appear between users that are not legally formalized. These agreements can be introduced on the basis of simple oral exchanges. This is what stakeholders call “piecemeal management” based mainly on exchanges of good practices (Bréthaut, 2013). The agreement can become formalized and can become part of the IRR if it leads to a revision of public policies.

In the LRA, the actors concretize and sometimes reinterpret the law according to local specificities as well as societal norms and values (Schweizer, 2015; Schweizer et al., 2016). Indeed, the legislation does not always meet the requirements of local actors faced with the need to make rapid decisions concerning the management of a resource. The LRA allows actors to adapt resource management strategies in three ways: (1) complement existing rules – when the actors innovate to enrich the legal provisions and improve the coherence of their implementation, (2) circumventing the rules – when the actors voluntarily decide not to apply the legal provisions, and (3) diverting the rules – when the actors use legal provisions to achieve a different objective than originally planned by the law (Bréthaut, 2013; Schweizer, 2015).

2.5. A brief history of the IRR

A project proposal to the Swiss National Science Foundation in 1998

² The crystallization of an emerging concept into an accepted denomination takes time. In this contribution, we use the expression “localized regulatory arrangement” (LRA) knowing that first attempts to capture this empirical object called it “rivalries management structure” (Gerber, 2006), “local arrangement” (Aubin, 2007), “local decision-making arena” (Knoepfel and Gerber, 2008) or “local regulatory arrangement” (Schweizer, 2015).

first introduced the notion of IRR.³ Twenty years later, more than a dozen applications with the Swiss National Science Foundation and international funding organizations have been conducted and the number of IRR-related publications is over 150 in half a dozen languages (see Lieberherr et al., *this volume*).

Since the late 1970s, environmental policy analysis brought important innovations to the emerging field of public policy analysis (Knoepfel et al., 2007). The growing complexity of environmental policy implementation led researchers to the development of conceptual frameworks, which included non-environmental policies as well for explaining the so-called “implementation deficits”. In real-life implementation processes environmental issues were often the “losers” faced with strongly established economic development policies, such as agricultural, industrial, infrastructural or regional development policies. Inter-policy coordination and cooperation were key concepts when trying to reconcile environmental concerns and strong non-environmental policies (Knoepfel, 1995). However, classical environmental policies tend to deal only with the use of the environment as a sink for pollution, therefore attempting to regulate the emission of pollutants, but without considering resources as a whole.

A major conceptual shift took place with the Brundtland-Report (1987) and its call to preserve the *reproduction capacity of resources* in order to meet the needs of today’s and future generations. This new way of formulating environmental issues in terms of resource overuse inevitably led to the question of the institutional rules governing actors’ uses that need to be precisely defined and coordinated with one another in order to guarantee the coexistence of various uses of one and the same resource. In this sense, the IRR framework was and still is transformative: it aims at promoting a scientific reflection about institutional rules able to guarantee the sustainable use of resources.⁴ This resource-based approach provided potential explanations for so-called implementation deficits in the field of environmental policies. Due to the strong constitutional protection of the institution of property, property-based use rights (e.g. landownership, water property titles or concessions) are always stronger than those granted to other actors by public policies (e.g. biodiversity users, scenic landscapes users).

As it happened within the Institutional Analysis and Development (IAD) framework (Ostrom, 2005, 2010), the debate on the regulation of resources started to include all kinds of non-natural resources.⁵ This expansion of the research field led to a corresponding enlargement of the application of the IRR framework to new resources and to focus on activities, which can involve multiple resources. This expansion brought new analytical challenges such as multi-level regulation of resources (Nahrath and Guerrin, *this volume*) or very sophisticated contractual elements impacting implementation processes (Nicol, 2012; Olgiati Pelet, 2011; Condo, 2017; Dussan, 2019; Laesslé, 2016).

Whereas the focus was initially on institutions as independent variables, notably through the reconstruction of the historical trajectories of the IRRs of various resources (e.g. historical screenings, see Knoepfel et al., 2001, and Lieberherr et al., *this volume*), successive applications of the framework have focused on empirical regimes in force within resource perimeters. This coheres with the observation in policy analysis that national regulations are frequently less significant

³ “Comparative analysis of the genesis and the effects of institutional resource regimes” (Project N° 1214 – 55890.98/1), applicants: Knoepfel, Varone and Kissling-Näf

⁴ The community’ motivation to push further the concept is based not only on academic curiosity but also on the political wish to “change the world” towards more sustainability. This basic conviction is still a key driving force shared by many members of the community.

⁵ From 1999 to 2018, the IRR framework was used to analyze following resources (chronological, non-exhaustive list): water, land, forest, air, landscape, fauna (hunting), road infrastructure, archives infrastructures, housing stocks, rural spaces, climate, urban services, railway and civil aviation networks infrastructure.

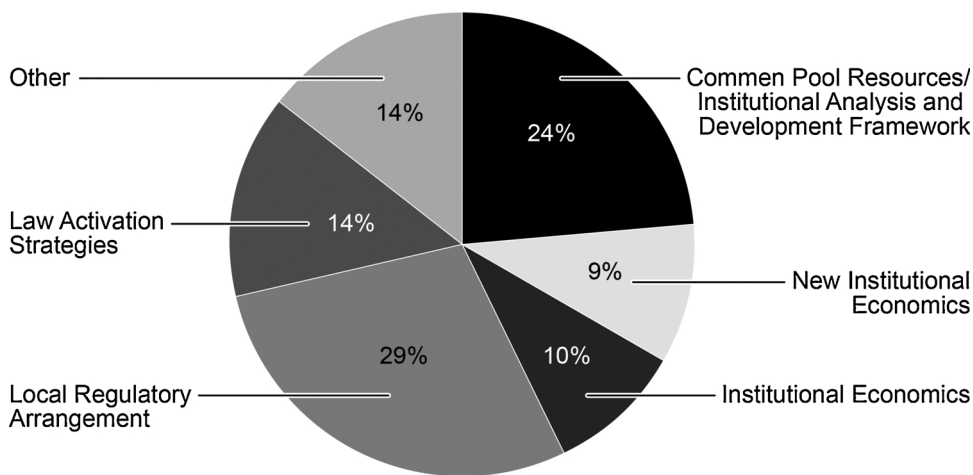


Fig. 4. Dialogue between IRR and other approaches. Through a screening of the IRR literature (see Lieberherr et al. *this volume* for the methods), we see that of the screened 120 IRR applications 16 have drawn on various approaches ($n = 16$). There is a predominance of LRA and law activation foci in IRR applications. The reason why the LRA and law activation strategies were separated from “mainstream” IRR literature, is that these can be seen as a new addition to the IRR approach. Within this screening we also find IRR studies linking with common-pool resource approaches and the IAD framework, and to a lesser extent on New Institutional Economics and Institutional Economics. This screening shows that IRR framework’s dialogue with law, political science and institutional economics.

for the explanation of policy outcomes than local policy games, the results of which are negotiated in arrangements amongst the implied actors. This shift of focus led to the development of the concept of the LRA. This focus on the LRA relativized the explanatory capacity of nationwide IRR and led to the necessity to consider such arrangements both as dependent (stemming from local policy games in the shadow of (inter)national components of IRRs) and as independent variables (explaining the degree of sustainability of the outcomes).

3. Dialogue with other approaches

The main objective of this special issue is to open a dialogue between the IRR framework and other analytical frameworks, because progress occurs through the confrontation of ideas (Fig. 4). In this section, we briefly present the contributions of this special issue and identify the frameworks that they rely on.

In their article, **Kevin Blake, Stéphane Nahrath and Karin Ingold** discuss the reciprocal benefits of a dialogue between the IRR and the Advocacy Coalition Framework (ACF) (Jenkins-Smith and Sabatier, 1993; Sabatier, 1998). While the former convincingly insist on the importance of formal rules on the regulation of the access to resources and on their sustainable management, the latter demonstrates how institutional rules, as well as their strategic mobilization by actors, are the product of ideas, action resources and political strategies. The ACF is able to explain how coalitions of actors coalesce around specific policy belief systems, share action resources and coordinate their actions in order to attain their political aims. Therefore, the ACF framework provides useful insights into the dynamics and changes of a regime during its lifespan (emergence, implementation, change), the actors’ objectives and their strategies during implementation processes. This is a highly innovative contribution, as the IRR literature to date has not yet drawn on the ACF (compare Fig. 4).

Elke Kellner, Christoph Oberlack and Jean-David Gerber open a dialogue between the IRR framework and the polycentric governance approach, which can be linked to the common-pool resource approaches and the IAD framework in Fig. 4. The article considers the LRA to often be polycentric, as it refers to the combination of all resource-specific localized use agreements that emerge through a bottom-up process under the umbrella of a given IRR. The authors explore how the degree of polycentricity of the LRA and the governance processes unfolding within and between LRAs shapes the coordination of resource uses and of norms regulating resource uses. This article also contributes to the literature on polycentricity by proposing new ways to operationalize polycentricity through the IRR. From a transformative research perspective, it highlights the barriers to improved coordination of water uses in the Alps under climate change.

Highlighting the IRR’s difficulty to conceptualize the multi-scalar

nature of natural resource management and to grasp the political games linked to the definition of the relevant scale(s) of the IRRs, **Stéphane Nahrath and Joana Guerrin** develop the theoretical links between the IRR framework and the politics of scale (Brenner, 2004). To do so, they rely on the Functional Regulatory Spaces (FRS) concept (Varone et al., 2013). This crossfertilization between approaches deepens our understanding of issues of scale in (natural) resource regulation by adding socio-political, institutional and historical depth.

Thomas Bolognesi and Géraldine Pflieger investigate the interlinkages between the coherence and extent, thus contributing to questions of transforming toward sustainability. Using the concepts of institutional complexity trap (ICT) and transversal transaction costs (TTC), they enter into dialogue with new institutional economics (NIT) and show that IRRs tend to fall into an ICT which prevents regime integration. An ICT is the macro consequence of TTC among public policies and property rights. The article examines TTCs at the micro level, from the perspective of actors subject to the regulation. This leads to a typology of TTCs with potential policy implementation, shedding light onto the debate on integration, siloization and intersectoral issues.

François-Xavier Viallon, Rémi Schweizer and Frédéric Varone combine two potentially complementary streams of literature: implementation studies and policy instruments attributes. By so doing, they expand the IRR’s ability to understand how the different paths of intervention (Fig. 2) are activated and combined on the ground and contribute to questions on political-legal complexity. This sheds some light for example on the way actors targeted by regulatory instruments may react. Their contribution shows how temporary compromises on the regulation of natural resources exploitation can appear in a given LRA.

The last article of this special issue, written by **Eva Lieberherr, Manuel Fischer and Amadea Tschannen**, takes stock of the studies conducted to date using the IRR framework and provides a first analysis of IRR studies over time by showing and discussing how different elements of the IRR framework are more or less popular in the literature. This assessment identifies three groups of IRR studies, that is, complex IRR studies, bottom-up IRR studies, and top-down IRR studies.

4. From basic to transformative research

In conclusion, we argue that one of the strengths of the IRR framework is its ability to conceptualize institutions in a way that echoes real-life resource use situations, by taking their complexity into consideration. In opposition to the situations studied by model-oriented researchers, real-life resource use situations are characterized by heterogeneous uses, which the IRR is able to grasp. Among the different users, there is a fundamental difference between those who secure their access to the resource with property rights and the others who lack such

rights. By highlighting the importance of property titles, the IRR framework also invites to reopen the controversial question of land-ownership and its socio-ecological implications (Marx, 1859; George, 1879; Bernoulli, 1946; Polanyi, 1957).

Because of its practical relevance, the IRR framework has been used in many consulting assessments, for instance in the field of rural and urban water management, river renaturalization or underground resource regulation. A think tank was also created that commonly relies on the IRR framework to analyze sustainable resource uses.⁶

Due to its proximity with the empirical reality, the IRR framework has been able to open a dialogue between disciplines (in particular law, political science, institutional economics, geography) and between researchers and practitioners. Among other reasons, this is linked to the IRR framework's central hypothesis connecting the regime in force with sustainability outcomes: one of the central messages of the IRR framework is that sustainability is an issue of institutional coherence and extent. Incoherence exacerbates conflicts between competing resource uses and tends to contribute to resource overuse and degradation (ecological sustainability). Simultaneously the uneven protection of users' interests – some can secure their interests with property titles, other cannot afford it – constitutes a serious obstacle to more egalitarian uses of resources (social sustainability). Incoherence can sometimes be improved in a LRA but, even if resource users are able to self-organize and develop innovative solutions, power relations engraved in rules in-force limit available leeway. The IRR framework is thus a highly useful tool to address core questions about the emergence and design of a regime that contributes to a more sustainable use of resources, which takes both formal and informal institutions into consideration.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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⁶ Sanu Durabilitas (source: www.sanudurabilitas.ch).

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